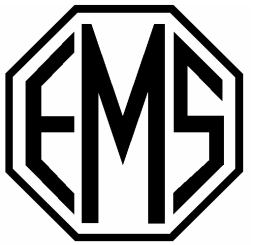

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User Manual
PRECISION ULTRASOUND BALANCE
Model 110

Declaration of Conformity

NOTICE: This equipment has been tested and found to comply with the limits class A digital device, pursuant to part 15 of the FCC rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications.

Operation of this equipment in a residential area may cause unacceptable interference to radio and TV reception requiring the operator to take whatever steps are necessary to correct the interference at his own expense.

General Information

This manual provides the necessary information for the installation and operation of the Precision Ultrasound Balance.

These instructions must be studied before putting the unit into operation.

The information contained in this manual is subject to change without notice.

No part of this manual may be photocopied, reproduced or translated into another language without the prior written consent of EMS Physio Ltd.

Record of Amendments

ISSUE	COMMENTS	DATE
3	Revised	10/04/2007
4	Revised	19/10/2011

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Warranty

This EMS Physio Ltd., (hereinafter called the company) product is warranted against defects in materials and workmanship for a period of two years from the date of shipment. The Company will at its option, repair or replace components which prove to be defective during the warranty period, provided that the repairs or replacements are carried out by the Company or its approved agents.

The Company will consider itself responsible for the effects on safety, reliability and performance of the product:-

only if assembly operations, re-adjustments, modifications or repairs are carried out by persons authorised by it,

only if the product is used in accordance with the instructions for use,

only if the electrical installation of the relevant room complies with the appropriate national requirements.

Should the product be returned to the Company for repair it must be sent carriage paid.

Introduction

The EMS Precision Ultrasound Balance has been developed in response to the increasing demand for equipment capable of testing and calibrating ultrasound therapy units.

The balance is based on the principle of measuring the radiation force produced on a suitable target by an ultrasound transducer.

The force is measured using a precision digital electronic balance programmed for direct read-out in watts. The unit is portable with carrying case.

Due to the fact that the unit is factory set, if any problems arise with the unit it is highly recommended that the unit is returned for service and re-calibration.

Environmental Considerations

For best results the Precision Ultrasound Balance should only be used in an environment free from excessive air currents or vibration. Do NOT install the balance near open windows or doors causing draughts or rapid temperature fluctuations, near heating or air-conditioning vents, near vibrating or rotating machinery, or on an uneven surface.

Technical Specification

Accuracy (Scale factor)	10%
Resolution	0.02 watts
Linearity	<0.1 watts
Stability (short term)	<0.1 watts/10 minutes
Zero Drift (after warm up)	<0.1 watts/hour
Warm up Time	<10 minutes
Full Scale	30 watts
Size	222 x 300 x 330 mm
Weight	4.0 kg (complete)
Water Capacity	1 litre
Recommended Frequency Range	0.8 to 3.5 MHz

Mains adaptor

Power input (AC)	100 mA @ 240V
Power output (AC)	500 mA @12V

Other mains adaptors are available on request.
An optional battery pack is available.

All the above are typical at 23 C.

The balance scalefactor has been programmed assuming the temperature of the de-gassed water is 23 C. Readings will be approximately 2% low if the actual water temperature is 13 C, and 2% high for 33 C.

The EMS Precision Ultrasound balance is supplied in a carrying case.

Unpacking

Upon receipt of the unit check for any damage which may have occurred in transit. If any signs of damage are found then retain all packing material and inform the carrier and the Company or its agent from whom the unit was purchased.

Each unit is supplied with a low voltage adaptor and cable. The adaptor, cable and unit all conform to international safety standards.

Check that the mains voltage and frequency indicated on the mains adaptor are as required. If the mains supply is NOT within the specified range DO NOT CONNECT THE MAINS ADAPTOR TO YOUR SUPPLY.

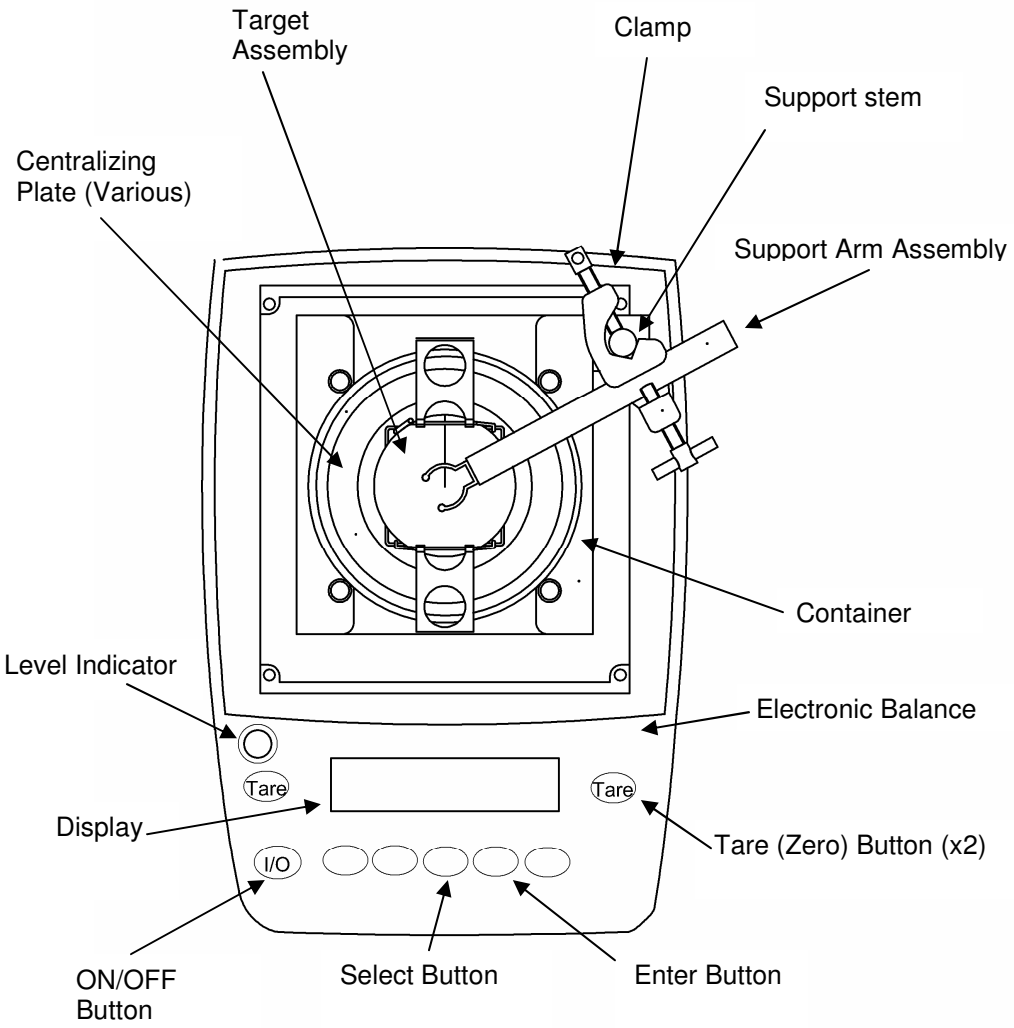

Figure 1 – Assembled Balance

Assembly

Refer to figure 1 - Assembled Balance

1. Withdraw the balance from the carrying case and place on flat and level surface.
2. Assemble the stand by screwing the support stem into the mounting block on the corner of the stand.
3. Level the balance using the adjustable feet, and check with the built in level indicator.
4. Carefully withdraw the target and container assembly from the carrying case.
5. Place the container on top of the stand, taking care to ensure that the weighbridge spindle is engaged on top of the loadcell and that the container is central between the location pegs of the stand.
6. Select a suitable workpiece clamp and fit to the stand support stem (the unit is supplied with quick release clamps for use with EMS heads and an adjustable clamp for use with other styles and sizes of heads).
7. The target container can now be filled with suitably degassed water. (To degas the water, it should be boiled and left to cool in a suitable covered container - see IEC 150.) Sodium Sulphide (at a ratio of 4g/litre) may be added to help degassing the water if required.
8. Once the container has been filled with degassed water, a suitable centralising plate may be fitted. (There are five sizes of plates for use with various EMS heads.)
9. If the source being tested cannot be used with a suitable centralising plate then ensure that the source is central to the target otherwise inaccurate readings may be obtained.
10. Before use, the target frame should be checked to see that it is not in contact with the head centralising plate.
11. Connect the output lead from the mains adaptor to the socket on the rear of the balance. Connect the mains adaptor to a suitable mains outlet.

The PRECISION ULTRASOUND BALANCE is now ready for use.

Controls and Markings

Refer to figure 1 - Assembled Balance.

Display:- The liquid crystal display gives a direct reading of ultrasonic power in Watts.

On/Off Button:- To turn the balance on, press the On/Off button.

Pressing either of the Tare buttons will zero the display

To turn the balance off, press and hold down the On/Off button.

Enter Button When first turned on, the balance will default to show grams. The Enter button will switch the display to the customised output (Watts).

Select Button **This button MUST ONLY be used to toggle between grams and watts AFTER the Enter button has been pressed. Incorrect use will allow access to and possible corruption of conversion factors.**

The EMS serial number of the balance and month / year of manufacture is shown on the label attached at the side of the balance.

Operating Instructions

1. Having assembled the balance and connected the mains adaptor to a suitable supply, switch on the balance.

2. The balance executes a short self-test routine, then displays zero. (0.000 g)

3. Press Enter to select the customised display (watts). **DO NOT** press Select – see previous page.

4. Position the ultrasound transducer being tested so that the active face of the transducer is just below the surface of the water, and so that the sound emitted from the device will hit the centre of the target cone. The transducer may be held in place using a centralising plate and quick release attachment if it is an EMS device, otherwise use the universal clamp supplied.

5. Make sure that there are no air bubbles trapped beneath the transducer.

6. Zero the balance by pressing one of the Tare buttons. (The balance should be re-zeroed before each measurement.)

7. Turn on the ultrasound output and wait for the output power display in watts to give a steady reading.

8. Make sure that no air bubbles form beneath the face of the transducer during use and that the transducer or its cable do not obstruct the frame which supports the target cone.

Maintenance

The Electronic Balance may be cleaned by wiping over with a clean damp cloth. The use of abrasive materials and cleaning solvents should be avoided.

Inspect the mains adaptor periodically for signs of damage, especially cable insulation.

The water used in the container must be changed at least weekly. Periodically remove the rubber absorbers from the container and clean them using warm soapy water. Rinse thoroughly after cleaning.

The calibration of the Ultrasound Balance may be checked periodically using the 10 W weight provided with the balance:-

Zero the balance.

Place the 10 W weight on the target frame assembly beneath the surface of the water.

Check that the Balance reads 10 W ± 0.5 W.

If the reading is not within the above range it is recommended that the Ultrasound Balance is returned to EMS for calibration.

Calibration of the Ultrasound Balance requires specialised test equipment and the balance must be returned to EMS Physio Ltd.

Troubleshooting

Symptom	Probable Cause	Remedy
1. No display	Power adaptor not connected	Connect power adaptor
2. Display HIGH	Overweight indication	Check target frame is not obstructed or damaged and container is full of water
3. The power reading changes constantly	Unstable ambient conditions (excessive vibration or draft) or a foreign object is caught between in the weighing pan/frame	Set up the balance in another area Remove the foreign object
4. The weight reading is obviously wrong	Balance not tared before measuring	Tare the balance

Parts List

Part Number	Description	Usage
24-96	Sartorious M Pact Pre	1
33-31	Screw M4x10mm	2
33-33B	Screw M4x12mm BUTT	7
B67-3-09	Water Container	1
A67-2-08	Support Stem	1
A67-2-10	Support Arm	1
A67-3-01	Support Peg	1
A67-2-12	10 Watt Test Weight	1
A67-3-02	Absorbing Rubber, Side	1
A67-3-03	Absorbing Rubber, Base	1
A67-3-04	Centralizing Plate, 1032 large head	1
A67-3-05	Centralizing Plate, 1030 head	1
A67-3-06	Centralizing Plate, 1032 small head	1
A67-3-08	Centralizing Plate, ML9120	1
A110-2-02	Mounting Block	1
A110-3-01	Centralizing Plate, Primo/SoLo large head	1
A110-4-01	Front and Rear Labels	1
L10	label ‘EMS Physio’	1
A110-5-05	Support Arm Assembly	1
B110-2-03	Stand Bracket	1
B110-5-02	Target assembly	1
C199	Clamp - general purpose	1
C200	Clamp boss	1
C201	Clip	1
5-133	Carrying case	1